

C1 Exercise 5A straight lines - gradient & intercept

1 Work out the gradients

a $y = -2x + 5$

$m = -2$ ✓

b $y = -x + 7$

$m = -1$ ✓

c $y = 4 + 3x$

$m = 3$ ✓

d $y = \frac{1}{3}x - 2$

$m = \frac{1}{3}$ ✓

$$d \quad y = -\frac{2}{3}x$$

$$m = -\frac{2}{3}$$

✓

$$f \quad y = \frac{5}{4}x + \frac{2}{3}$$

$$m = \frac{5}{4}$$

✓

$$g \quad 2x - 4y + 5 = 0$$

$$4y = 2x + 5$$

$$y = \frac{1}{2}x + \frac{5}{4}$$

$$m = \frac{1}{2}$$

✓

$$h \quad 10x - 5y + 1 = 0$$

$$5y = 10x + 1$$

$$y = 2x + \frac{1}{5}$$

$$u_n = 2$$



$$i \quad -x + 2y - 4 = 0$$

$$2y = x + 4$$

$$y = \frac{1}{2}x + 2$$

$$u_n = \frac{1}{2}$$



$$1) -3x + 6y + 7 = 0$$

$$6y = 3x - 7$$

$$y = \frac{1}{2}x - \frac{7}{6}$$

$$m = \frac{1}{2}$$

$$1k \quad 4x + 2y - 9 = 0$$

$$2y = -4x + 9$$

$$y = -2x + \frac{9}{2}$$

$$m = -2$$

$$1 \quad 9x + 6y + 2 = 0$$

$$6y = -9x - 2$$

$$y = -\frac{3}{2}x - \frac{1}{3}$$

$$b = -\frac{3}{2}$$

2 These lines intercept the y-axis at $(0, c)$. Find c .

$$a \quad y = -x + 4$$

$$c = 4$$

$$b \quad y = 2x - 5$$

$$c = -5$$

$$2c \quad y = \frac{1}{2}x - \frac{2}{3}$$

$$c = -2/3$$

$$d \quad y = -3x$$

$$c = 0$$

$$e \quad y = \frac{6}{7}x + \frac{7}{5}$$

$$c = 7/5$$

$$f \quad y = 2 - 7x$$

$$c = 2$$

2g

$$3x - 4y + 8 = 0$$

method 1: rearrange

$$4y = 3x + 8$$

$$y = \frac{3}{4}x + 2$$

$$c = 2 \quad \checkmark$$

method 2: substitute $x=0$

$$x=0 \Rightarrow 3(0) - 4y + 8 = 0$$

$$\Rightarrow -4y + 8 = 0$$

\Rightarrow

$$y = 2$$

$$\Rightarrow c = 2$$

$$2k \quad 4x - 5y - 10 = 0$$

$$5y = 4x - 10$$

$$y = \frac{4}{5}x - 2$$

$$c = -2 \quad \checkmark$$

$$2i \quad -2x + y - 9 = 0$$

$$y = 2x + 9$$

$$c = 9 \quad \checkmark$$

2j

$$7x + 4y + 12 = 0$$

$$4y = -7x - 12$$

$$y = -\frac{7}{4}x - 3$$

$$c = -3$$

✓

$$2x - 2y + 3 = 0$$

$$2y = 2x + 3$$

$$y = \frac{1}{2}x + \frac{3}{2}$$

$$c = \frac{3}{2} \quad \checkmark$$

$$21 \quad -5x + 4y + 2 = 0$$

$$4y = 5x - 2$$

$$y = \frac{5}{4}x - \frac{1}{2}$$

$$C = -\frac{1}{2} \quad \checkmark$$

3 Write these in the form $ax + by + c = 0$

a $y = 4x + 3$

$$4x - y + 3 = 0 \quad \checkmark$$

3b

$$y = 3x - 2$$

$$3x - y - 2 = 0 \quad \checkmark$$

3c

$$y = -6x + 7$$

$$6x + y - 7 = 0$$



-

3d

$$y = \frac{4}{5}x - 6$$

$$5y = 4x - 30$$

$\nearrow \times 5$

$$4x - 5y - 30 = 0$$

$\nearrow -5y$ and swap sides.



3c

$$y = \frac{5}{3}x + 2$$

$$3y = 5x + 6$$

$$5x - 3y + 6 = 0 \quad \checkmark$$

,

2f

$$y = \frac{7}{3}x$$

$$3y = 7x$$

$$7x + 3y + 0 = 0$$

$$7x + 3y = 0$$

(preferred)

59

$$y = 2x - \frac{4}{7}$$

$$7y = 14x - 4$$

$$14x - 7y - 4 = 0$$

3h

$$y = -3x + \frac{2}{9}$$

$$9y = -27x + 2$$

$$27x + 9y - 2 = 0$$



move to left to get rid of
negative x coefficient.

31

$$y = -6x - \frac{2}{5}$$

$$3y = -18x - 2$$

$$18x + 3y + 2 = 0$$

✓

3j

$$y = -\frac{1}{3}x + \frac{1}{2}$$

$$6y = -2x + 3$$

$$2x + 6y - 3 = 0$$



↗ $\times 6$ since 6 is the LCM(2,3).

3k

$$y = \frac{2}{3}x + \frac{5}{6}$$

$$6y = 4x + 5$$

$$4x - 6y + 5 = 0$$

✓

-

36

$$y = \frac{3}{5}x + \frac{1}{2}$$

$$10y = 6x + 5$$

$$6x - 10y + 5 = 0$$



4 A line is parallel to $y = 5x + 8$ with intercept $(0, 3)$

Its equation is

$$y = 5x + 3 \quad \checkmark$$

5

A line ℓ to $y = -\frac{2}{5}x + 1$ has y-intercept $(0, -4)$

An equation is

$$y = -\frac{2}{5}x - 4$$

\Rightarrow

$$5y = -2x - 20$$

$$2x + 5y + 20 = 0$$



6 A line $\ell_{\ell 1}$ to $3x + 6y + 11 = 0$ has y-intercept $(0, 7)$

original

$$6y = -3x - 11$$

$$y = -\frac{1}{2}x - \frac{11}{6}$$

new

$$y = -\frac{1}{2}x + 7$$



7 Line $16x$ to $2x - 3y - 1 = 0$ thru $(0,0)$

original

$$3y = 2x - 1$$

$$y = \frac{2}{3}x - \frac{1}{3}$$

new

$$y = \frac{2}{3}x$$

8 Line $y = 6x - 18$ meets x -axis at P . Find P .

At x -axis, $y = 0$

$$0 = 6x - 18$$

$$18 = 6x$$

$$x = 3$$

$$P = (3, 0) \quad \checkmark$$

9 Line $3x + 2y - 5 = 0$ meets x -axis at P . Find P

$$y = 0 \Rightarrow 3x - 5 = 0$$

$$x = \frac{5}{3}$$

$$P = \left(\frac{5}{3}, 0\right) \quad \checkmark$$

10 Line $5x - 4y + 20 = 0$ meets y -axis at A and x -axis at B. Find A and B..

$$\text{at A } x=0 \Rightarrow -4y + 20 = 0 \\ \Rightarrow y = 5$$

$$\text{at B } y=0 \Rightarrow 5x + 20 = 0 \\ \Rightarrow x = -4$$

$$\text{So } A = (0, 5) \quad \text{and} \quad B = (-4, 0)$$